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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/595,434	04/19/2006	Siegfried F. Karg	CH920030009US1	9566

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EXAMINER	
HORNING, JOEL G	

ART UNIT	PAPER NUMBER
1712	

NOTIFICATION DATE	DELIVERY MODE
11/26/2010	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

EFIPLAW@US.IBM.COM

Office Action Summary	Application No.	Applicant(s)	
	10/595,434	KARG ET AL.	
	Examiner	Art Unit	
	JOEL G. HORNING	1712	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 November 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *10-16* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *10-16* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 11-05-2010 has been entered.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

2. **Claims 10-14 and 16** are rejected under 35 U.S.C. 103(a) as being unpatentable over Uesugi (US 4873413) in view of Jersch (Applied Physics A **66**, 29-34 (1998)).

Uesugi teaches a method for direct writing a layer of material onto a substrate by focusing a laser beam to intensify it on a substrate; locally heating the substrate in the presence of a vapor of a precursor to the material, causing the thermal decomposition of the precursor vapor and deposition of the material in that localized region. The focused laser beam is then scanned over the substrate in order to form a predetermined pattern of the deposited material (col 1, lines 14-34, figure). Uesugi teaches using a lens to focus the laser, not an AFM probe tip.

Jersch is also directed towards using a focused laser to heat a substrate, so the surface can be modified (abstract). However, Jersch teaches it is possible to focus and intensify the light onto the substrate and scan it in a desired pattern by a so called FOLANT technique which utilizes scanning force microscope tips. From figure 2 and the description of the SFM (scanning force microscopy) tip, it can be considered an atomic force microscopy tip (section 2, experimental evidence of field enhancement). Jersch further teaches that the resulting enhancement is found in the electromagnetic near field to the tip and that surface plasmon resonance produced at the tip is one of the reasons for the intensification of the field (section 1, field enhancement of laser irradiated SPM tips).

Thus it would have been obvious to a person of ordinary skill in the art at the time of invention to use the FOLANT technique with an AFM tip, as taught by Jersch, to focus the laser **(claim 14)** at the surface of the substrate to get the necessary intensity there so that the material vapor between the tip and the substrate will decompose, instead of using the lens taught by Uesugi, since it was another known

method for focusing a laser beam onto a substrate for the purposes of surface modification, which would be expected to produce predictable results.

Since the AFM tip is intensifying the light from the beam so that it is only strong enough to decompose the vapor, it is readily apparent that the light beam itself would not be strong enough to decompose the vapor, even at the tip, otherwise, the decomposition would not only occur locally (making patterning less effective), and making the AFM intensification superfluous to the process, since it would not control where the deposition occurs **(claim 10)**.

3. Regarding **claim 11**, Uesugi teaches using WF_6 as the precursor vapor (col 10, lines 16-20).
4. Regarding **claim 12,** Jersch teaches that the laser beam polarization should be parallel to the long (longitudinal) axis of the probe (section 2, experimental evidence of field enhancement).
5. Regarding **claim 13**, Jersch teaches that the field enhancement (amplification) of the light due to the FOLANT a function of the wavelength (optical frequency "ω") of the laser light used (see equations 1 and 2) and that it even affects the mechanism by which the field enhancement occurs (plasmon resonance only occurs with certain materials and for certain wavelengths, section 1, Field enhancement of laser irradiated SPM tips).

Thus it would have been obvious to a person of ordinary skill in the art at the time of invention to control the laser frequency in order to produce the desired amplification level to decompose the precursor vapor with the probe tip used since it

was a variable which was known to affect the amplification level and would produce predictable results. Since the probe tip has a size, the wavelength of the light is adapted to match the size of the probe tip used **(claim 13)**.

6. Regarding **claim 16**, Jersch further teaches coating the tip with metal, such as gold or silver in order to improve the enhancement factor of the probe tip and produce better mechanical properties (section 1, Field enhancement of laser irradiated SPM tips).

7. **Claim 15** is rejected under 35 U.S.C. 103(a) as being unpatentable over Uesugi (US 4873413) in view of Jersch (Applied Physics A **66**, 29-34 (1998)) as applied to claim 10, further in view of Mirkin et al (US 20020063212).

Uesugi in view of Jersch does not teach using multiple probe tips at the same time for the deposition process.

However, Mirkin et al is also directed towards a process of depositing layers of material using AFM tips as the deposition source (abstract). It teaches using multiple AFM tip arrays for the deposition process in order to enable depositing material from multiple tips simultaneously, resulting in a process where "both imaging and patterning speeds could be dramatically improved" [0185].

Thus it would have been obvious to a person of ordinary skill in the art at the time of invention to use multiple tips at the same time in order to dramatically improve the patterning speed of the process **(claim 15).**

Response to Amendment

8. The declaration under 37 CFR 1.132 filed November 5th, 2010 in combination with the amendments to the claims is sufficient to overcome the previous of claims 10-16 based upon Yau in view of Asahino in view of Jersch I. These references do not teach using surface Plasmon resonance. However, upon further search and consideration, the Jersch II reference was found, which does teach using surface Plasmon resonance, so the claims are currently rejected on this new basis.

Response to Arguments

9. Applicant's arguments with respect to claims 10-16 have been considered but are not convincing in view of the new ground(s) of rejection.

Conclusion

10. No current claims are allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOEL G. HORNING whose telephone number is (571) 270-5357. The examiner can normally be reached on M-F 9-5pm with alternating Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael B. Cleveland can be reached on (571)272-1418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/J. G. H./
Examiner, Art Unit 1712

/David Turocy/
Primary Examiner, Art Unit 1715